Lake Trout Working Group Report
Lake Michigan Committee Meeting
March 20, 2008 – Niagara Falls, ON

This report provides a brief overview of the status of lake trout populations and restoration efforts in Lake Michigan. It is intended to provide a quick, graphical representation of pertinent data, and is structured around the population objectives articulated in *A Lake trout Restoration Guide for Lake Michigan* (Bronte et al. *in press).* Those objectives generally follow the ontogeny of lake trout and recommend population benchmarks to increase the probability of significant and sustained natural reproduction by hatchery-reared fish. Graphical presentations provide current measures within a time series (when available) and compare current values to a target value to gauge progress towards restoration.

Goal: In targeted rehabilitation areas, reestablish genetically diverse populations of lake trout composed predominately of wild fish able to sustain fisheries.

Objective 1 (Increase genetic diversity): Increase the genetic diversity of lake trout by introducing morphotypes adapted to survive and reproduce in deep-water, offshore habitats, while continuing to stock shallow-water morphotypes.

Result: Klondike Reef strain from Lake Superior has been recommended for introduction to deepwater habitats; the LMC has decided that a limited number should be stocked experimental in the near future. Lean lake trout from Seneca Lake (Finger Lakes, NY), Lake Superior (Apostle Islands), and Lewis Lake (Lake Michigan remnant) have been selected as the primary lean lake trout strains. Parry Sound (Lake Huron), a remnant, near shore, lean lake trout strain under development in FWS hatcheries, will also be considered in the future.

Objective 2 (Increase overall abundance): By 2014, increase densities of lake trout populations in targeted rehabilitation areas to levels observed in other Great Lakes locations where recruitment of wild fish to the adult population has occurred. To achieve this objective, CPUE in spring assessments should consistently exceed 25 lake trout/1000 feet of graded-mesh gill net (2.5-6.0 inch).

Results: Spring gill net assessments in 2007 indicate that overall abundance remains below the target level of 25 lake trout/1000 ft of net (horizontal line) lake wide (Figure 1) and in most statistical districts (Figure 2, 3). The Southern Refuge and Illinois continue to have the highest relative abundance of lake trout compared to other areas.

Figure 1. Lakewide relative abundance of lake trout (mean number of fish/1000 ft of graded mesh gill net), spring 1998-2007.

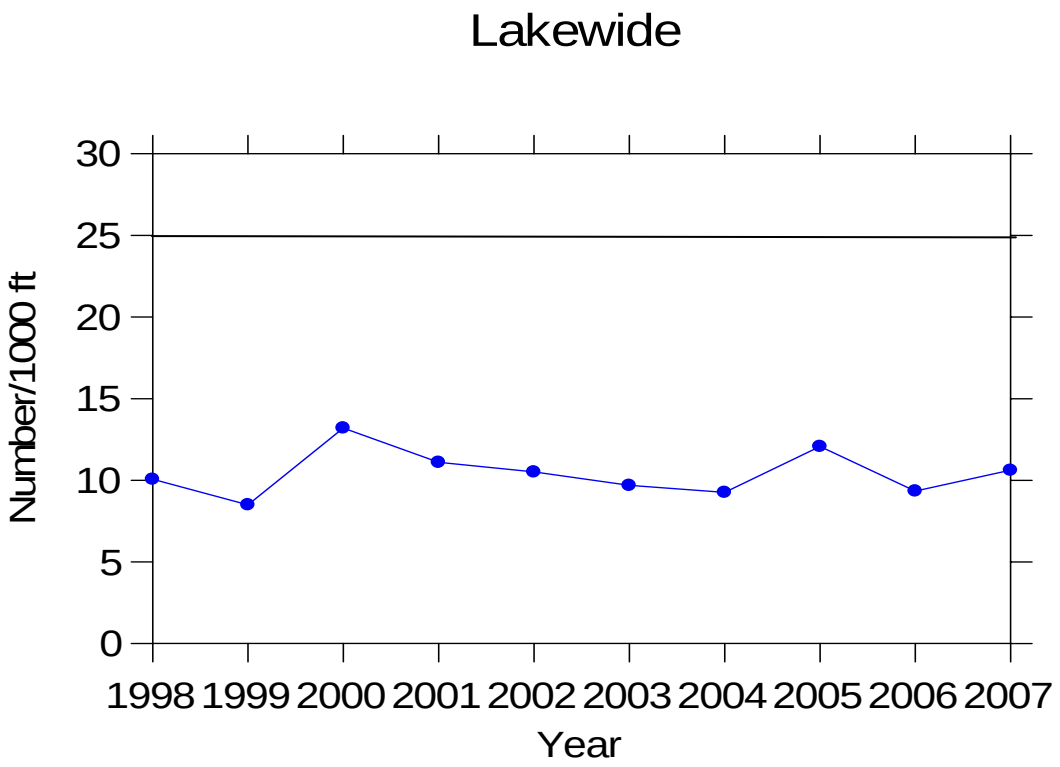


Figure 2. Statistical districts for lake trout management in Lake Michigan.

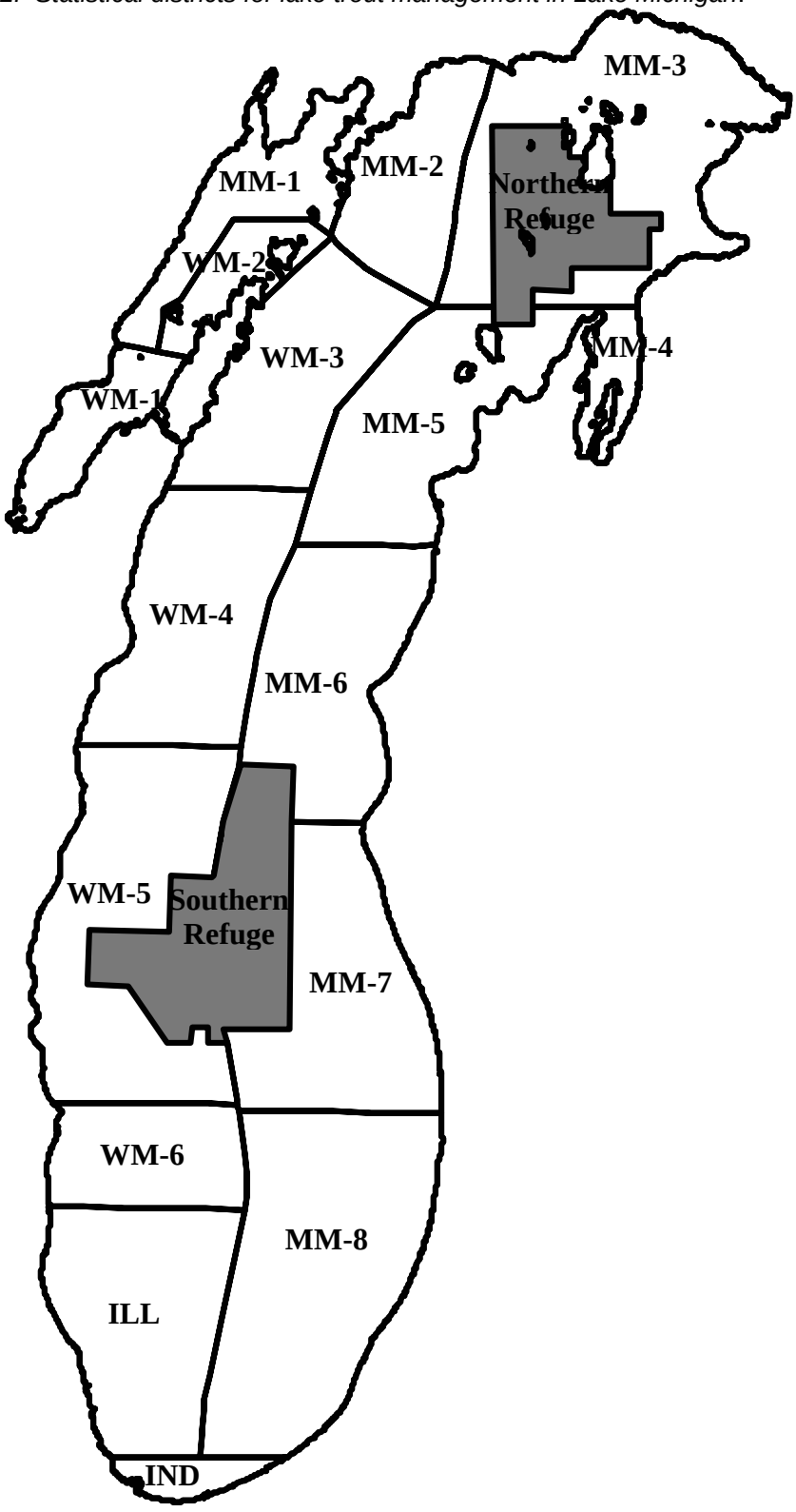


Figure 3. Relative abundance of lake trout (mean number of fish/1000 ft of graded mesh gill net) by statistical district and refuge, spring 1998-2007.

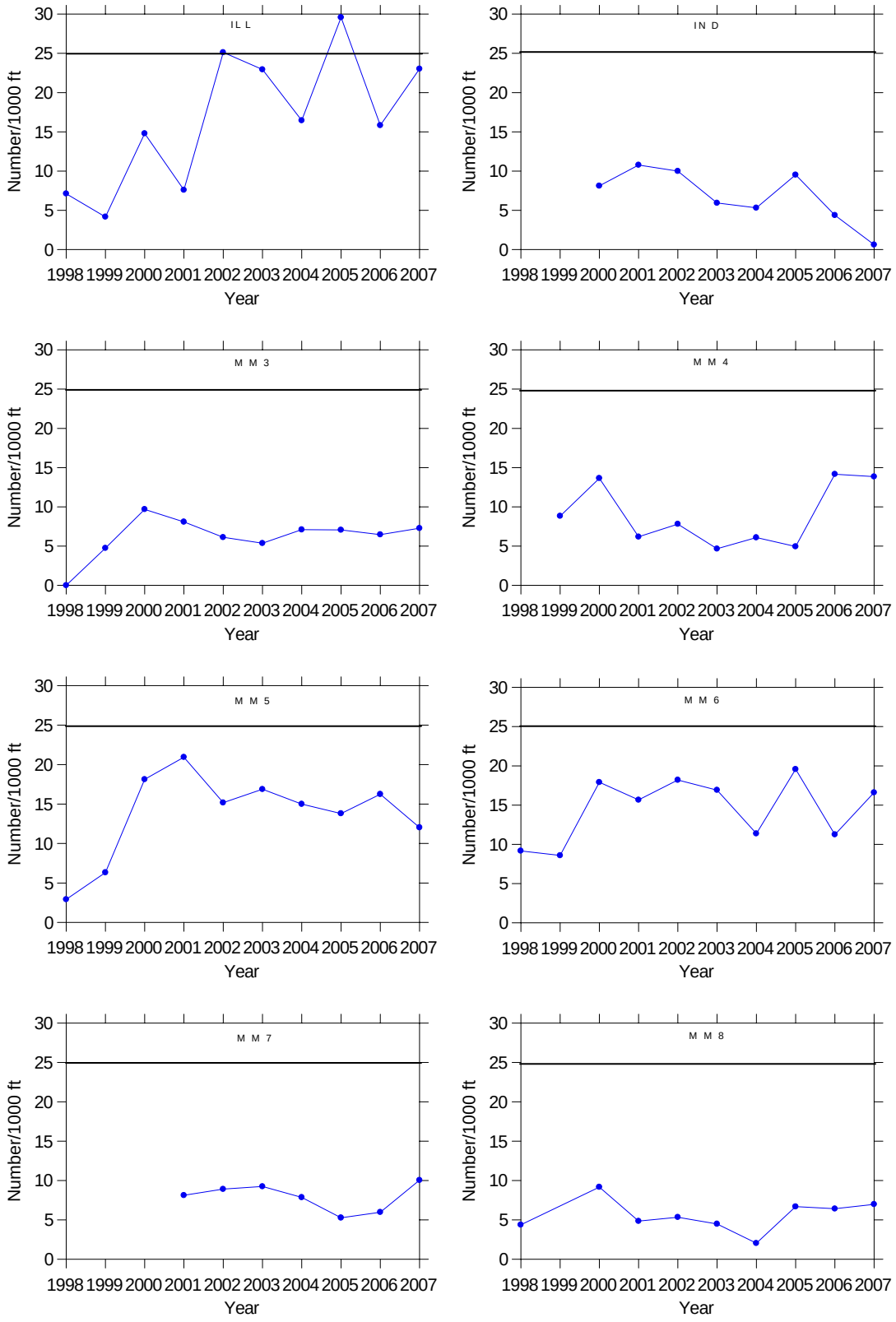
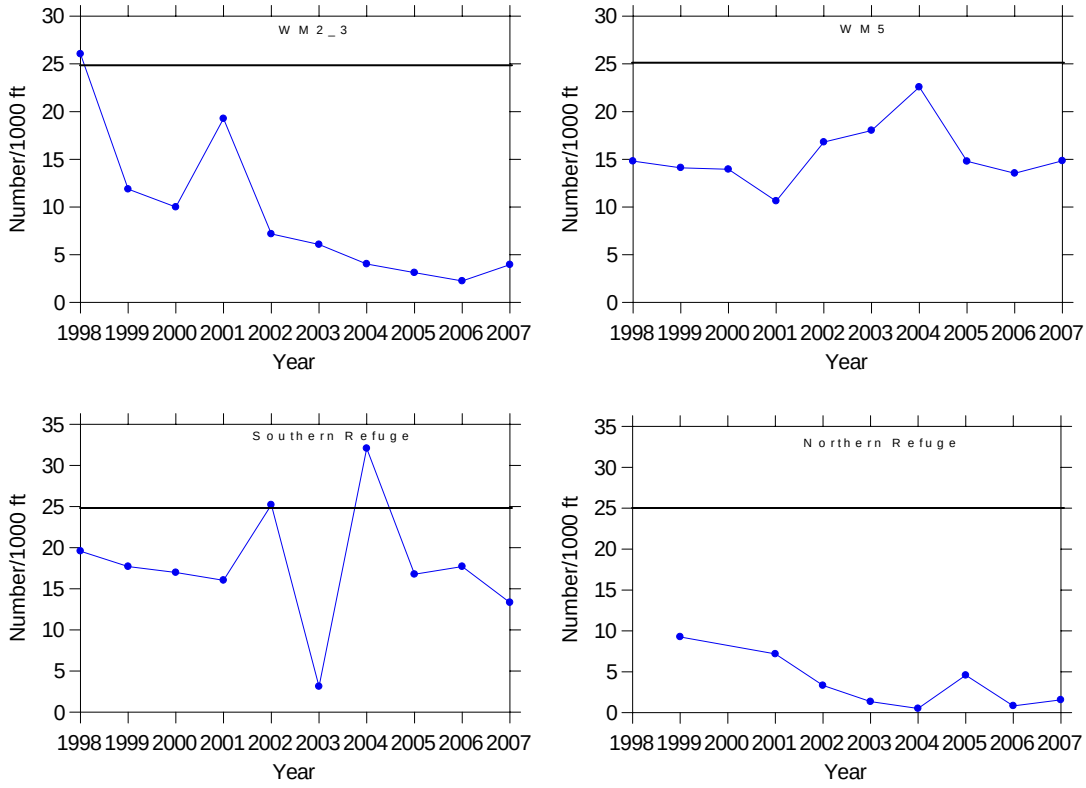


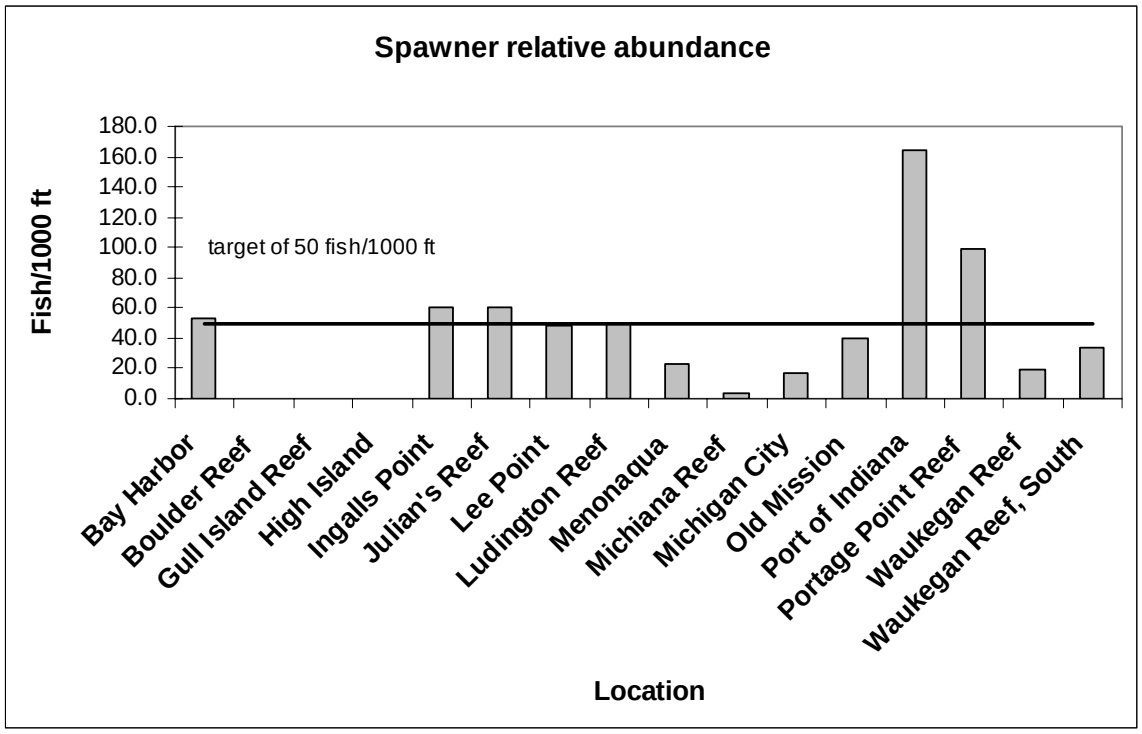
Figure 3 continued.



Objective 3 (Increase adult abundance): By 2020, achieve densities of spawning adult lake trout in targeted rehabilitation areas to those observed in other Great Lakes locations where recruitment of wild fish to the adult population has occurred. To achieve this objective CPUE in fall assessments should consistently exceed 50 fish/1000 ft of graded-mesh (4.0-6.0 inch) gill net fished.

Results: Only 7 of 16 spawning areas sampled in 2007 met or exceeded the target (Figure 4). Abundance of adult fish is low and likely inadequate to result in egg deposition rates that could over come impediments to rehabilitation. The lowest spawner numbers were measured at High Island, Boulder, and Gull Island Reefs within the Northern Refuge where only one adult was captured and this correspond with overall low densities of lake trout measured there in the spring (Figure 3).

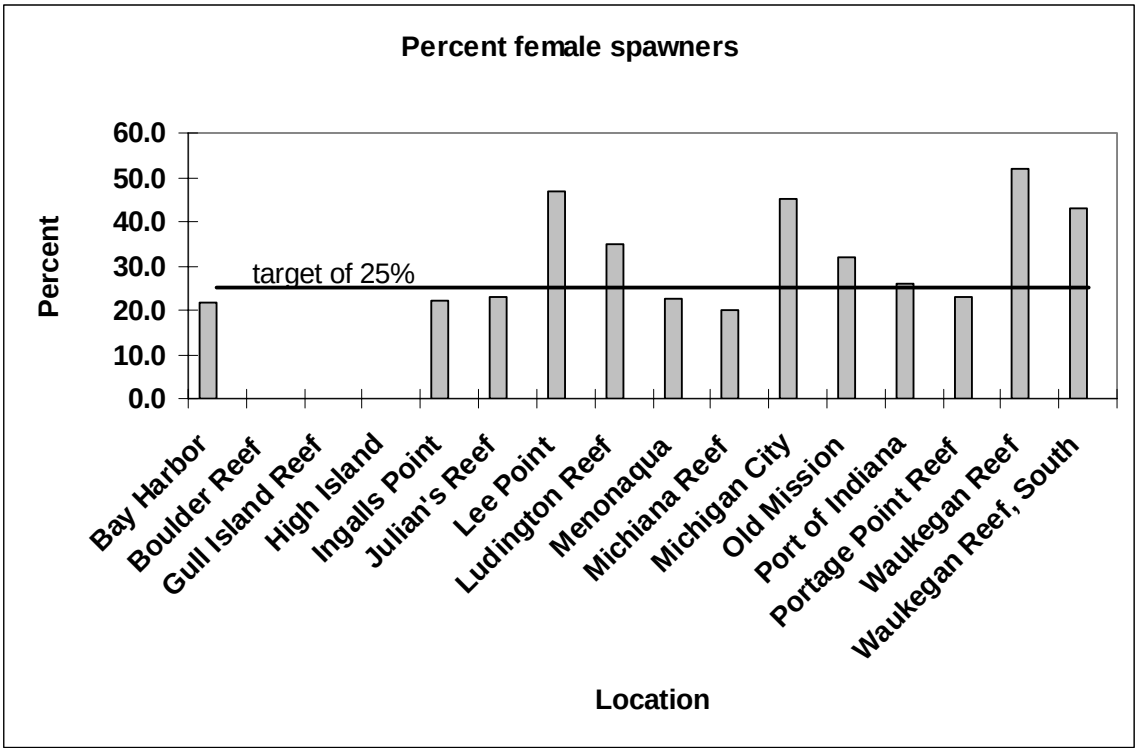
Figure 4. Relative abundance of lake trout spawners by location in 4.5-6.0 inch mesh gill nets in fall, 2007.



Objective 4 (Build spawning populations): By 2024, spawning populations in targeted rehabilitation areas stocked prior to 2008 should be at least 25% females and contain 10 or more age groups older than age 7. These milestones should be achieved by 2032 in areas stocked after 2008.

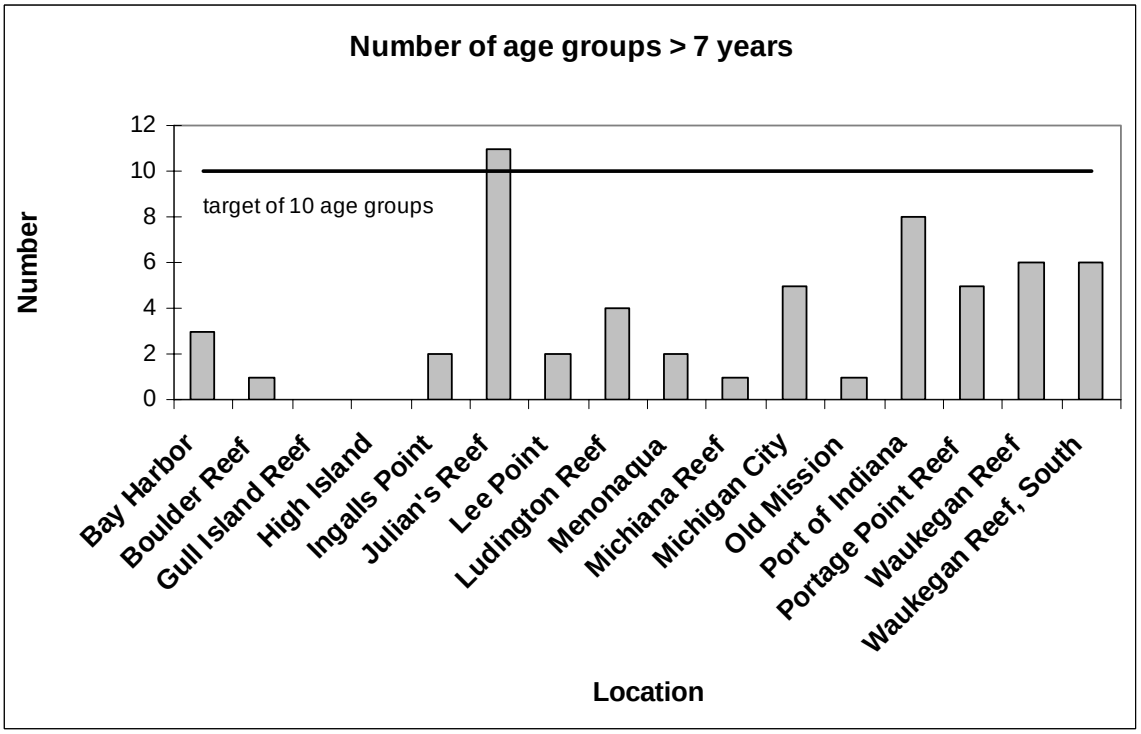
Results: Most sites sampled in 2007 were close to or exceeded the target for female percentage (Figure 5). No females were observed at Boulder, Gull Island or High Island.

Figure 5. Percentage of fall spawners that were female by location, fall 2007.



Age compositions of spawning lake trout at sites sampled in 2007 were far younger than required, and only 1 site in Illinois waters, Julian's Reef, met the target of 10 or more age groups older than age-7 (Figure 6).

Figure 6. Number of age groups greater than 7 years in spawner surveys by location, fall 2007.



Objective 5 (Detect egg deposition): By 2021, detect a minimum density of 500 viable eggs/m^2 (eggs with thiamine concentrations > 4 nmol/g) in previously stocked areas. This milestone should be achieved by 2025 in newly stocked areas.

Results: Development of a self-deploying egg trap has been completed by Jake Riley and J. Ellen Marsden of the University of Vermont, and may be soon available for obtaining quantitative measures of egg deposition.

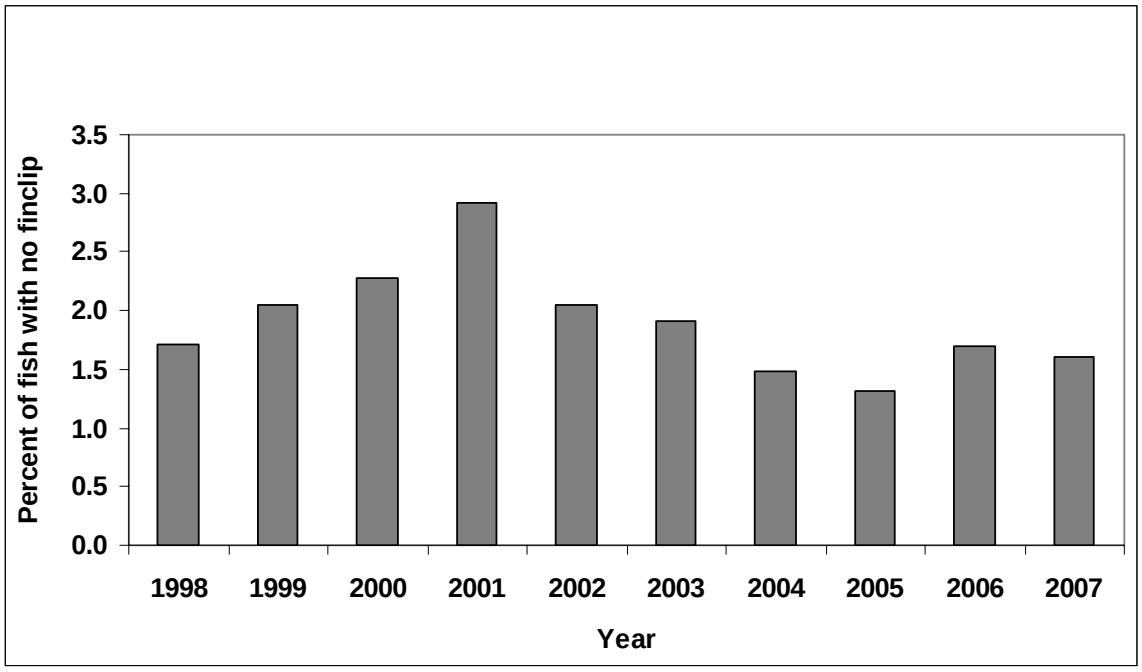
> *Riley, J. W. 2007. Predation pressure on emergent lake trout fry in Lake Champlain and techniques for assessing lake trout reproduction in deep-water habitats. University of Vermont.*

Measures of thiamine in lake trout eggs were limited in 2007 but a summary is found in *Thiamine Status of Lake Trout Eggs*, by Stephen Riley (USGS, Great Lakes Science Center).

Objective 6 (Detect recruitment of wild fish): Consistent recruitment of wild lake trout in targeted rehabilitation areas should occur as follows: by 2022 detect age-1 fish in bottom trawls, by 2025 detect age-3 fish in spring graded-mesh-gill-net assessments, and by 2028 consistently detect sub-adults.

Results: Less than 2% of lake trout of all ages captured in 2007 in the spring were those that had no fin clip, which indicates little natural reproduction (Figure 9). No wild fish have been seen in bottom trawl surveys.

Figure 9. Percentage of lake trout captured in spring without fin-clips. Lack of a fin-clip may suggest that the fish was produced in the lake.



Objective 7 (Achieve restoration): By 2037, 75% or more of the lake trout in deep- and shallow-water habitats should be age-10 and younger and of wild origin.

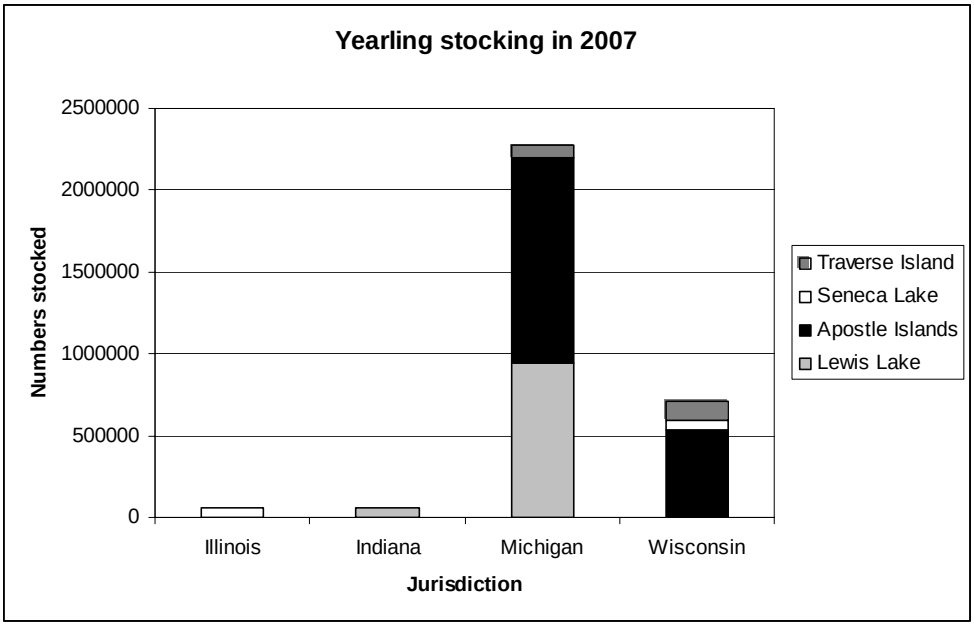
Results: Populations far from targets.

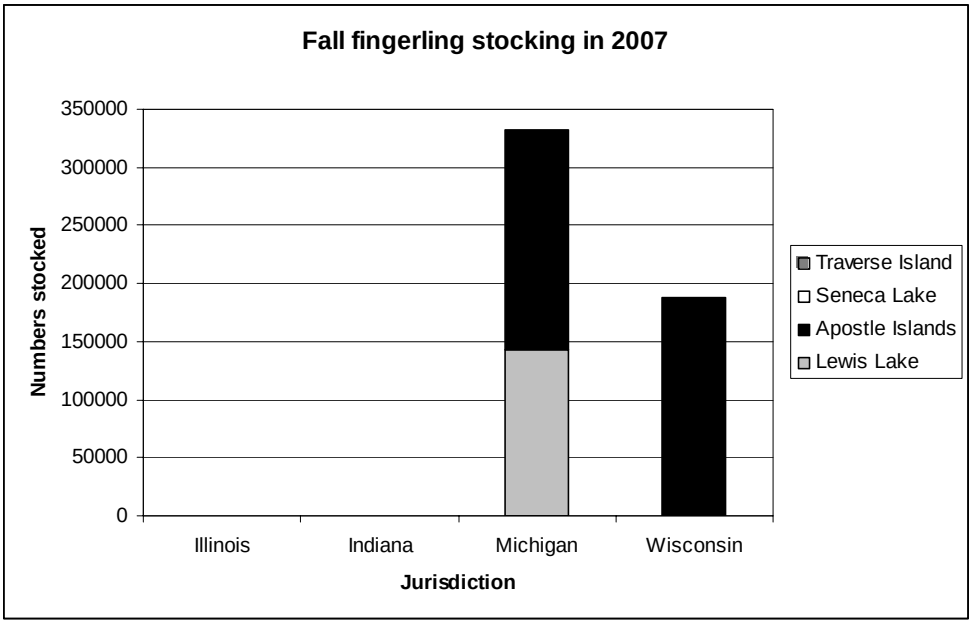
Lake trout stocking

A total of 3.10 million yearling (14-16 months old) lake trout of four strains of the 2006 year class was stocked into Lake Michigan in 2007 by the U.S. Fish and Wildlife Service. Stocking totals for each state jurisdiction were fish 56,381 in Illinois, 60,045 in Indiana, 2,272,262 in Michigan and 714,652 in Wisconsin (Figure 10). All yearling fish received a RPLV fin clip; no fish with an AD fin clip and coded wire tags (ADCWT) pending the completion of a new rehabilitation implementation plan under development by LMC. Additionally, 520,675 fall fingerlings of two strains were stocked into Michigan and Wisconsin waters and received a RV fin clip (Figure 10). Details on lake trout stocking can be found in

Hanson, D. 2008. Stocking summary for Lake Michigan 1976-2007. LMC report.

Figure 10. Spring yearling and fall fingerling lake trout stocking in Lake Michigan, 2006.





The Lake Michigan Lake Trout Working Group

Brian Breidert, Indiana Department of Natural Resources, Michigan City, IN
Charles Bronte, U.S. Fish and Wildlife Service, New Franken, WI
Mark Ebener, Chippewa/Ottawa Resource Authority, Sault Ste. Marie, MI
Mark Holey, U.S. Fish and Wildlife Service, New Franken, WI
Jory Jonas, Michigan Department of Natural Resources, Charlevoix, MI
Steve Lenart, Little Traverse Bay Band of Odawa Indians, Harbor Springs, MI
John Netto, U.S. Fish and Wildlife Service, New Franken, WI
Charles Madenjian, U.S. Geological Survey, Ann Arbor, MI
Archie Martell, Little River Band of Ottawa Indians, Manistee, MI
Patrick McKee, Wisconsin Department of Natural Resources, Sturgeon Bay, WI
Erik Olsen, Grand Traverse Band of Ottawa and Chippewa Indians, Suttons Bay, MI
Paul Peeters, Wisconsin Department of Natural Resources, Sturgeon Bay, WI
Steve Robillard, Illinois Department of Conservation, Des Plaines, IL
Tim Smigielski, U.S. Fish and Wildlife Service, Elmira, MI
Greg Wright, Chippewa/Ottawa Resource Authority, Sault Ste. Marie, MI